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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/731,150

12/10/2003

Chih Yuan Huang

681939-55US

4810

570 7590 03/21/2007  
AKIN GUMP STRAUSS HAUER & FELD L.L.P.  
ONE COMMERCE SQUARE  
2005 MARKET STREET, SUITE 2200  
PHILADELPHIA, PA 19103

EXAMINER

KORNAKOV, MIKHAIL

ART UNIT

PAPER NUMBER

1746

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/21/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/731,150

Applicant(s)

HUANG ET AL.

Examiner

Michael Kornakov

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 9-11 and 15-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 12-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 06/25/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicants' election of claims 1-14 and the specie of composition of the first cleaning solution recited in claim 7 in the reply filed 01/08/2007 is acknowledged. While not necessary agreeing with the Examiner's requirement or arguments regarding restriction, as stated in Applicants' reply, Applicants have failed to point out wherein either (1) the reasons advanced by the Examiner to establish distinctiveness between the inventions as claimed or (2) the evidence of separate status, classification and/or search are in error. Therefore the restriction requirement is made final.
2. Claims 9-11, 15-20 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions, there being no allowable generic or linking claim. Claims 1-8, 12-14 are examined on the merits.

### ***Specification***

3. The disclosure is objected to because of the following: paragraph 013 discloses "cleaning the semiconductor wafer using a 5:1:1 H<sub>2</sub>O:H<sub>2</sub>O<sub>2</sub>:NH<sub>4</sub>OH solution", which is a standard SC1 cleaning solution (paragraph 007). Paragraph 031 discloses the use of a "standard SC1 cleaning solution, wherein the proportions of H<sub>2</sub>O:H<sub>2</sub>O<sub>2</sub>:NH<sub>4</sub>OH fall in the range of 1:1-5:4-80", which is apparently not a standard SC1 cleaning solution. Therefore, it is not clear, which SC1 cleaning solution Applicants regard as standard.

Appropriate clarification is required.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1- 8, 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 20030045098 in view of US 20060051920.

US'098 discloses a semiconductor cleaning process comprising forming gate structure, including polysilicon, wherein the steps of cleaning include treatment with ozonated water, then treatment with the first cleaning solution that is  $\text{NH}_4\text{OH}/\text{H}_2\text{O}_2$  and water, then with the second cleaning solution (0059; Fig. 15A-15D; and 0210). The gate structure is formed by etching.

The disclosure of US'098 differs from the instant claims by not specifically disclosing the sandwiched structure of the gate layer between two oxide layers, however providing general teaching of the same polysilicon gate layer and one of the oxide layers as claimed. It is well known in the art to form sandwiched layers of oxides having polysilicon layer in between, such as disclosed in US 20060051920 (see, e.g., claim 4).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to cover the polysilicon layer of US'098 with oxide, as suggested by US'920 to protect the polysilicon gate layer and to clean the resulting gate structure in accordance with the teaching of US'098 with reasonable expectation of success.

With specific regard to claims 7, 8, 12, 13, it is noted that the criticalities of such ratios are not disclosed and the indicated ratios can be obtained by those skilled in the art via routine experimentation, and since the general conditions of the process are met, such optimization is obvious.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 20030045098 in view of US 20060051920 and further in view of US 20030056806.

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The combination of US 20030045098 and US 20060051920 does not specify the second cleaning solution as containing deionized ozonated water, however teaches that the second cleaning solution comprises HF.

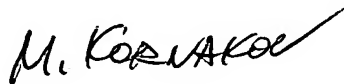
Using ozonated water in combination with HF is conventional in semiconductor cleaning processes, such as disclosed in US'806. US'806 discloses a method of cleaning residue on semiconductor devices includes mixing HF and ozone water and dipping a semiconductor device in the vessel containing the solution of HF and ozone water. Thus it would be obvious to those skilled in the art to add ozonated water to the HF of US'098 in order to enhance cleaning and better remove polymer residues.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael Kornakov  
Primary Examiner  
Art Unit 1746

03/17/2007